What is claimed is:

1. A transmitting station suitable for use in a wireless communication system, comprising:

a time base;

a communication signal generator outputting a communication signal in synchronization with the time base; and

a spread spectrum signal generator coupled to the communication signal generator and outputting a spread spectrum position determination signal in synchronization with the time base.

2. The transmitting station of claim 1, further comprising:

a diplexer coupled to the communication signal generator and the spread spectrum signal generator, and outputting a composite signal including the communication signal having embedded therein the spread spectrum position determination signal; and

an antenna coupled to the diplexer and outputting the composite signal to the wireless network.

3. The transmitting station of claim 1, further comprising:

a first wireless transmission section coupled to the communication signal generator and transmitting the communication signal using a first antenna; and

a second wireless transmission section coupled to the spread spectrum signal generator and transmitting the spread spectrum signal using a second antenna.

4. The transmitting station of claim 1, wherein the spread spectrum signal is a chirp spread spectrum signal.

5. The transmitting station of claim 4, wherein the communication signal comprises at least two frames and the chirp spread spectrum signal includes a first portion embedded in a first frame of the communication signal and a second portion embedded in a second frame of the communication signal.

6. The transmitting station of claim 5, wherein the first portion of the chirp spread spectrum signal is an up-chirp portion linearly increasing in frequency with time, and the second portion of the chirp spread spectrum signal is a down-chirp portion linearly decreasing in frequency with time.

7. A transmitting station suitable for use in a communication network, comprising:

a time base;

a communication signal generator means for outputting a communication signal in synchronization with the time base; and

a spread spectrum signal generator means for outputting a spread spectrum position determination signal in synchronization with the time base.

8. The transmitting station of claim 7, further comprising:

combining means for combining the communication signal and the spread spectrum position determination signal into a composite signal; and

broadcasting means for broadcasting the composite signal in the communication network.

9. The transmitting station of claim 7, further comprising:

first transmission means for transmitting the communication signal using a first antenna; and

second transmission means for transmitting the spread spectrum signal using a second antenna.

10. The transmitting station of claim 7, wherein the spread spectrum signal is a chirp spread spectrum signal.

11. The transmitting station of claim 10, wherein the communication signal comprises at least two frames and the chirp spread spectrum signal includes a first portion embedded in a first frame of the communication signal and a second portion embedded in a second frame of the communication signal.

12. The transmitting station of claim 11, wherein the first portion of the chirp spread spectrum signal is an up-chirp portion linearly increasing in frequency with time, and the second portion of the chirp spread spectrum signal is a down-chirp portion linearly decreasing in frequency with time.

13. A mobile unit receiver suitable for use in a wireless communication network, comprising:

a receiving section configured to receive from a transmitting station a wireless communication signal having a communication signal with a plurality of frames and a spread

spectrum navigation signal embedded in the communication signal in synchronization with said frames;

a synthesizer unit configured to generate a frequency signal;

a mixer having a first input port coupled to the receiving section, a second input port coupled to the synthesizer unit, and an output port outputting a wireless communication signal downconverted based on the frequency signal; and

a signal processor unit coupled to the mixer and configured to receive the downconverted signal output from the mixer, wherein the signal processor unit is configured to detect the embedded navigation signal and determine a pseudorange measurement based on the detected embedded navigation signal.

14. The mobile unit receiver of claim 13, wherein the embedded navigation signal is a spread spectrum chirp signal and the signal processor unit comprises:

a chirp generator configured to generate a reference chirp signal based on timing of the frames in the communication signal;

a correlator connected to the chirp generator and configured to correlate the reference chirp signal with the downconverted wireless communication signal and output a correlation signal; and

an arrival time estimator configured to output a pseudorange value based the correlation signal.

15. The mobile unit receiver of claim 14, further comprising a filter connected to the output port of the mixer and the signal processor unit, and configured to filter the

downconverted signal based on a frequency band corresponding to a plurality of the frames of the communication signal.

16. The mobile unit receiver of claim 13, wherein the embedded navigation signal is a spread spectrum chirp signal and the signal processor unit is configured to correlate the wireless communication signal with a reference chirp signal, and to output a pseudorange signal based on the correlation, and wherein the synthesizer unit is coupled to the signal processor unit and configured to adjust the frequency signal based on the pseudorange signal.

17. The mobile unit receiver of claim 16, further comprising a filter connected to the output port of the mixer and the signal processor unit, and configured to filter the downconverted signal based on a frequency band corresponding to a single frame of the communication signal.

18. A mobile unit receiver suitable for use in a wireless communication network, comprising:

receiving means for receiving from a transmitting station a wireless communication signal having a communication signal with a plurality of frames and a spread spectrum navigation signal embedded in the communication signal in synchronization with said frames;

synthesizer means for generating a frequency signal;

downconverting means for downconverting a frequency of a wireless communication signal based on with a frequency signal; and

processing means for detecting the embedded navigation signal in the downconverted wireless communication signal and determining a pseudorange measurement based on the detected embedded navigation signal.

19. The mobile unit receiver of claim 18, wherein the embedded navigation signal is a spread spectrum chirp signal and the processing means comprises:

chirp generator means for generating a reference chirp signal based on timing of the frames in the communication signal;

correlator means for correlating the reference chirp signal with the downconverted wireless communication signal and outputting a correlation signal; and

means for estimating an arrival time of the communication signal based the correlation signal and outputting a pseudorange value.

20. The mobile unit receiver of claim 19, wherein the embedded navigation signal is a spread spectrum chirp signal and said means for estimating an arrival time correlates the wireless communication signal with a reference chirp signal and outputs a pseudorange signal based on the correlation, and wherein said synthesizer means adjusts the frequency signal based on the pseudorange signal.

21. A method of transmitting a spread-spectrum position determination signal with a communication signal generated in synchronization with a transmitter time base, the method comprising:

generating the spread spectrum signal in synchronization with the transmitter time base; and

transmitting the spread spectrum signal with the communication signal.

22. The method of claim 21, wherein the spread spectrum signal is a chirp spread spectrum signal.

23. The method of claim 22, wherein the communication signal comprises at least two frames and the chirp spread spectrum signal includes an up-chirp first portion embedded in the first frame and a down-chirp second portion embedded in the second frame.

24. The method of claim 23, wherein the up-chirp portion of the spread spectrum signal is a signal linearly increasing in frequency with time and the down-chirp portion of the spread-spectrum signal is a signal linearly decreasing in frequency with time.

25. A method, comprising:

embedding a first spread spectrum signal in a first portion of a communication signal; and

embedding a second a spread spectrum signal in a second portion of the communication signal.

26. The method of claim 25, wherein the communication signal is a time division multiplex, frequency division multiple access (TDM/FDMA) communication signal, and the first and second portions of the communication signal are first and second TDM frames, respectively.

27. The method of claim 25, wherein the first and second spread spectrum signals are chirped spread spectrum signals.

28. The method of claim 27, further comprising generating the first spread spectrum signal using a chirp signal of a first sense, and generating the second spread spectrum signal using a chirp signal of a second sense opposite to the first sense.

29. A method of determining a location of a mobile unit in a communication system, the method comprising:

extracting a chirp spread spectrum signal from a communication signal broadcast from a transmitter, wherein the chirp spread spectrum signal is synchronized with a frame structure of the communication signal; and

determining a pseudorange measurement between the mobile unit and the transmitter based on the extracted chirp spread spectrum signals; and determining a location of the mobile unit based on the pseudorange measurement.

30. The method of claim 29, wherein the communication signal includes a frame having a plurality of slots and the chirp spread spectrum signal is embedded within the frame, said extracting the chirp spread spectrum signal comprises extracting the chirp spread spectrum signal only during the slots that are not used for transmission or reception of the communication signal.

31. The method of claim 30, wherein a chirp spread spectrum signal is extracted by correlating the received chirp spread spectrum signal with a local reference chirp spread spectrum signal over an observation period corresponding to a plurality of time slots, and wherein the time base of the local reference chirp spread spectrum signal is derived from the communication signal without reference to an external timing source.

32. The method of claim 31, wherein the correlations are computed on an individual time slot basis and accumulated using a weighting coefficient for each time slot.

33. The method of claim 32, wherein said weighting coefficients are determined based on measurements of noise and interference levels received during the time slots, and to maximize a signal-to-noise-plus-interference ratio of an accumulated correlator output.

34. The method of claim 29, further comprising determining at the mobile unit a position of the mobile unit based on the pseudorange measurement and other range measurements.

35. The method of claim 29, further comprising transmitting the pseudorange measurement to a location processing center for determining the position of the mobile unit.

36. A transmission signal embodied on a carrier wave, the transmission signal comprising:

a communication signal having a plurality of frames, each frame having a plurality of slots; and

a chirp spread spectrum signal synchronized with the plurality of frames.

37. The transmission signal of claim 36, wherein the communication signal is a Global System for Mobile Communications (GSM) signal.